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ABSTRACT

This pocket folder of instructional materials is designed to introduce youths aged 9 to 12 to the nature and needs of wildlife and to give children the opportunity to search for wildlife and their signs. The document includes a member's guide, a leader's guide, field record forms, and wildlife project materials. The illustrated 4-H member's guide contains information about the need for food, water, cover, and space of various kinds of wildlife. It includes activities for identifying animal tracks, casting tracks in plaster of paris, and attracting tracks with food. There are also activities for analyzing owl pellets, recording the wildlife in a "minihabitat," searching for frogs' eggs, tadpoles, and adult frogs, and identifying the groups to which animals belong. The member's guide also contains reproducible record sheets to accompany the activities and a page of resources and references. The leader's guide provides suggestions on additional activities and teaching techniques. Field record forms provide questions for student to answer and to document the activities. The remainder of the document includes the following supplemental materials: (1) a wildlife project pamphlet titled, "Urban and Backyard Wildlife,"; (2) a wildlife project pamphlet titled, "Wildlife Foods," and (3) a sheet containing suggestions for shooting wildlife photography. (KS)

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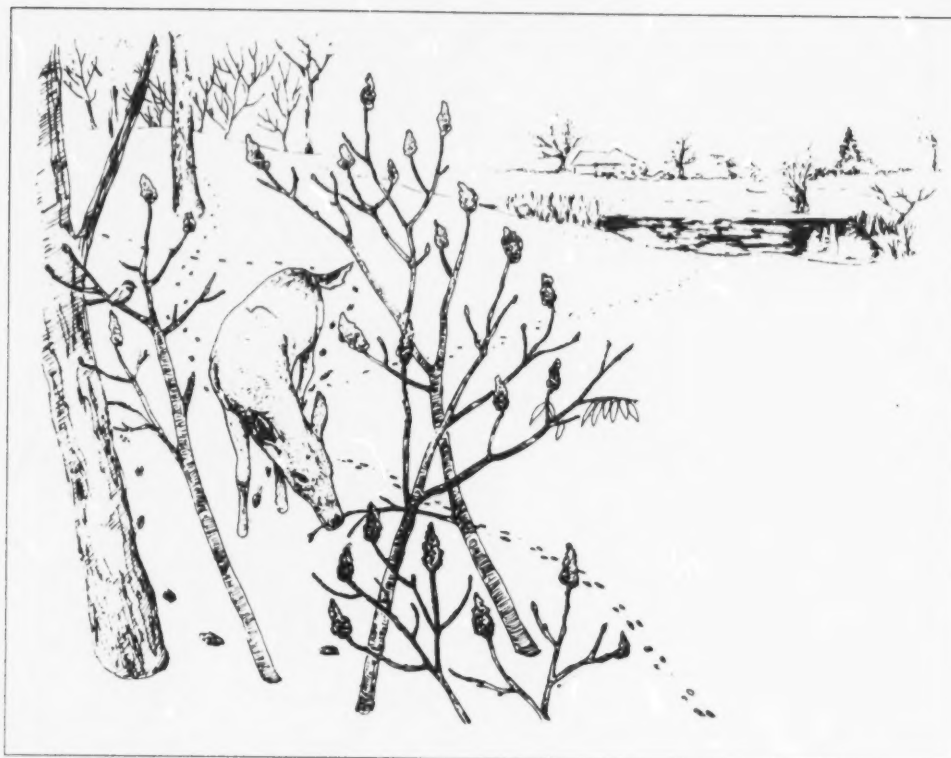
4-H NATURAL RESOURCES

Wildlife Discovery

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4-H Member's Guide

M-5-19

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Cornell Cooperative Extension

*Helping You
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to Work*

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This project is part of a series designed to introduce youth to a variety of natural resources subjects by involving them in activities that heighten their awareness of the natural world. Leaders, teachers, and camp counselors need no background in natural resources to work and learn with youth on these activities.

Introduction

Wild animals live all around us. Yet, how often do you see wildlife? You probably watch birds flying near your home, especially if you have a bird feeder. Maybe you have seen deer searching for food in a snowy field.

Most wild animals, however, stay hidden. Few people ever see a fox, an opossum, or a white-footed mouse even when these animals live close to them. Many animals are active at night when people are home in bed. These animals pick good hiding spots for resting during the day. Animals that are out in daylight usually smell, hear, or see a person before the person sees them. They hide quickly when a large animal (such as a person) approaches.

You can learn to detect wildlife that live near you without ever seeing them! Wild animals leave special signs that tell you they are close by.

Different animals have different footprints. A wildlife detective can identify the animals that go through an area by looking at the tracks they leave in snow and mud. Dens, burrows, nests, and other animal

homes are also clues for a wildlife detective. When squirrels and chipmunks chew nuts and rabbits and deer chew branches, they leave behind signs that identify them. Animal droppings, called scat, are another clue.

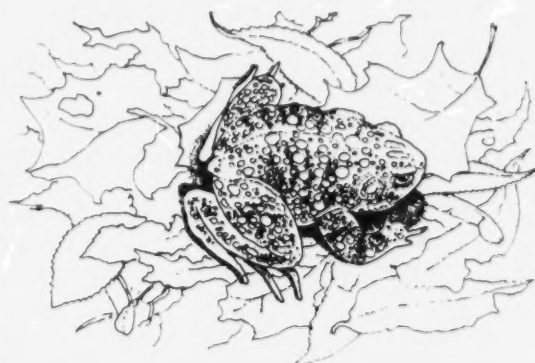
To search for animal clues, you must know what animals require to live. All wildlife have special needs and live only where these are available. Like people, wildlife must be able to find food, water, and a safe home.

Food is essential for animals. Some wildlife eat nuts, fruits, twigs, leaves, or other parts of plants. These animals live only where such plants grow. Other animals hunt insects, mice, rabbits, or other prey (animals that are eaten by others). They must

live where they can catch their food. Certain animals, such as raccoons, eat many different plants and animals and can live in many different places. Animals that eat only a few foods have a limited choice of places to live.

Animals need **water**. Streams or ponds have plenty of water for animals such as beavers, which live only where there is water. Deer, raccoons, and other wildlife visit streams, ponds, and puddles, but they do not need to live near the water. Desert animals cannot find water for most of the year; they get all they need from seeds, stems, and other plant parts.

Cover is a necessity for animals. Some animals need cover in which to hide. Rabbits, for example, hide under brush piles or shrubs or in burrows when a fox or hawk is near. Many animals use cover to keep their babies safe from hunting animals. Song sparrows build nests in trees and woodchucks dig underground burrows to keep their young under cover. Animals also look for cover when resting, sleeping, or feeding.





Animals need **space**. Large animals require more space than small animals because they need to find more food and water. Animals that hunt other animals need more space than those that eat plants because their prey usually inhabit a large area.

Land that supplies enough food, water, cover, and space for an animal is called that animal's **habitat**. In other words, an animal's habitat has everything that the animal needs to live throughout the year. If an area does not provide everything that a particular animal needs, then the animal will not use that spot for its home. For example, rabbits will not live in a field that has no cover in which to hide even when there is enough food, water, and space.



Animal Tracks

You can find animal tracks almost any place outside. The best place to look is near water—streams, ponds, swamps, and puddles—where animals go to drink. They walk in the soft mud at the water's edge and leave tracks that you can follow. Fields of new snow and wet sandy areas are also good places to look for tracks.

Every time you find animal tracks, you discover a story about an animal's life.

Materials Needed

- a ruler
- an Animal Tracks Record
- a pencil
- a field guide to animal tracks

What to Do

1. Decide which way the animal was traveling. This will be easy if the tracks have claw marks or toe prints, since claws and toes face forward. Hooved animals, such as deer, have two toes that form a heart-shaped print; the point of the heart faces forward. All animals push back loose dirt as they travel; this dirt will be at the rear of each footprint.



Walking deer tracks in snow



2. Decide if all the tracks you see were made by one animal. If not, were they made by two or more of the same animal or by different animals? Is one animal larger than another? Does it look like one animal was chasing another? Do the tracks stop at a pile of brush or other hiding place? Do they disappear at the bottom of a tree? If you find the tracks of a porcupine, chipmunk, squirrel, or other tree climber, then the trail may end where the animal went up a tree.



Squirrel tracks in snow

3. Try to discover what an animal ate as you follow its tracks. Look for chewed or clipped branches when you see tracks circling a bush; these often are signs left by feeding deer. Fallen trees and stumps with tooth marks are clues along a beaver's trail. The tracks of a hunting animal may lead you to traces of fur, feathers, bones, or blood left after the animal killed and ate its prey. Gray squirrels, red squirrels, and deer mice leave behind shells of acorns, black walnuts, and hickory nuts. Apple trees attract lots of wildlife.

4. Follow the trail to a place where the footprints are very clear and look closely for a pattern in the tracks. The track pattern is your first clue to identifying the animal that made the track.

Was the animal hopping, walking, or running?

Rabbits, hares, mice, voles, squirrels, and chipmunks hop. They push off with their back feet, land on their front feet, and bring their back feet past the front. Their tracks show the large hind feet side by side and ahead of the smaller front feet.



Rabbit tracks

Otters, fishers, and most other weasels also hop, but they reach forward with their front feet and then bring their back feet just behind the front pair. Their tracks show the small front feet ahead of the large rear feet.

Deer, dogs, foxes, and cats walk mostly on their toes, so their footprints frequently show only the center foot pad and toes.



Fox tracks



Bears, skunks, porcupines, and raccoons walk flat-footed, leaving behind a print of their entire paw.



Raccoon tracks

5. Look closely at one set of prints for your next clue about the animal you are tracking. Count the number of toes on the front and back feet and look for claw marks.

Foxes, coyotes, wolves, and dogs make tracks with four front and four back toes. Each toe print is next to a claw mark.

Bobcats, lynx, mountain lions, and cats pull in their claws when they walk. Their tracks show four front and four back toes but no claw marks.



Walking bobcat tracks



Rabbits and hares leave tracks with four toes and no claw marks, but the prints from their back paws are about twice as large as the prints from their front paws.



Rabbit tracks





Cast a Track

The tracks of chipmunks, squirrels, woodchucks, rats, and other rodents show four toes on the front feet and five toes with claw marks on the back feet. Weasel tracks show five toes in the front and five in the back.



Running weasel tracks in snow

Raccoons, bears, and opossums make tracks that show five toes on both the front and back paws and resemble human hands and feet.



Raccoon tracks

Deer, moose, goats, and most other hooved animals walk on their two toes.

6. The last clue to collect is the size of the track. Measure the length and width of the front and back footprints and the distance between footprints.

7. You now have the clues you need: the pattern of the tracks, the number of toes on the front and back feet, the presence of claws, and the size of the print. Write down your observations on the Animal Tracks Record. You can solve the mystery of who made the tracks by looking in a field guide to animal tracks.

Take tracks home by making plaster casts, or impressions, of them. The best tracks for casting are deep, clear tracks.

Materials Needed

- several 2 1/2-inch-wide strips of waxed cardboard cut from a milk carton
- paper clips
- plaster of paris, purchased at a hardware store or hobby shop and placed in a jar with a lid
- a can without a top
- water in a plastic container
- a stick or paint stirrer for mixing



What to Do

1. Find a deep, clear track to cast. Take away sticks, nuts, and other debris near the track.
2. Put the strips of waxed cardboard into a circle around the track. Attach the ends of the cardboard strips together with paper clips.
3. Push the cardboard into the ground about 1/2 inch deep, and pack dirt around the outside of the cardboard to keep it steady.
4. Pour some plaster of paris into the can and add enough water to make a thin batter (like pancake batter). Stir the mixture. If the batter is too thick, add more water.
5. Pour the plaster into the cardboard circle, covering the track completely. Wait at least ten minutes for the plaster to harden.
6. Remove the cardboard, and your cast is complete! Later, paint the track if you wish.

Additional Suggestions

1. Make one large cast of several foot prints. Place cardboard around the whole four-foot pattern of a rabbit or squirrel or around a few prints of a fox or raccoon to show the distance of an animal's step.
2. Make casts in your own backyard. Try making casts of your own hand or foot prints or the tracks of a dog, cat, or farm animal.

Attract a Track

The easiest way to attract animals is to leave food outside. By clearing an area around a feeding spot, you can be sure that animals will leave fresh tracks when they come for food.

Materials Needed

- a low flat stone or small board
- a rake
- wood ash, fine soil, or sand (optional)
- food for animals (peanut butter, nuts, sunflower seeds, fruit, or meat)
- a field guide to animal tracks

What to Do

1. Choose a site where you have seen signs of wildlife (tracks, animal homes, scat, or animal chewings). A stream bottom or the border between a forest and a field is a good place to attract wildlife. The feeding site should be a fairly flat area where few people visit.
2. Place the flat stone or board in the center of the feeding site.
3. Rake the ground around the stone or board, making a circle that is about 16 feet wide. Remove sticks, stones, and other debris from the ground. If you cannot make the soil loose by raking it, then cover the ground with enough wood ashes or sand so that tracks can be seen.
4. Place a small piece of bait on the stone or board. Since many animals are active at night, it is best to put out the bait in the late afternoon and

come back the next morning to check for tracks. Wait at least eight hours before returning to the feeding site. Before you leave, clear your footprints from the circle by raking over them.

5. Bring a field guide with you when you return to check for tracks. Identify as many of the tracks as possible. If you wish, make casts of some of the tracks.

Additional Suggestion

1. Experiment with different baits. See if you attract different animals by putting out different foods.



Owl Pellets

It is easy to find out what an owl eats. Owls swallow their prey whole or tear them up into large chunks and then swallow. But they do not digest all the parts. Instead, they cough up balls (called pellets) of bones, teeth, hair, and feathers. By carefully taking an owl pellet apart, you can find the skeleton and other parts of the animal the owl ate.

Materials Needed

- owl pellets
- tweezers

What to Do

1. Look for owl pellets around the bases of large trees in the woods. If you know where owls nest or roost (rest in trees), then look near those trees for pellets. Your local nature center may be able to tell you where to look for pellets.

2. The real fun begins when you find a pellet. With a pair of tweezers, carefully separate the bones, teeth, feathers, fur, and other parts of the pellet. Put the fur and feathers in one pile, the bones and teeth in another pile, and any other parts in a third pile. (You might find insect or plant parts). Do this in a well-ventilated area, and avoid breathing dust from the peilet.

3. Try to figure out what the owl last ate. What color fur (or feathers) covered the prey? Do the bones in the pellet come from one or more animals? Try to piece together any broken parts of the skeleton. Owls eat rabbits, mice, shrews, rats, and other animals. Does your skeleton look like it came from any of these animals?

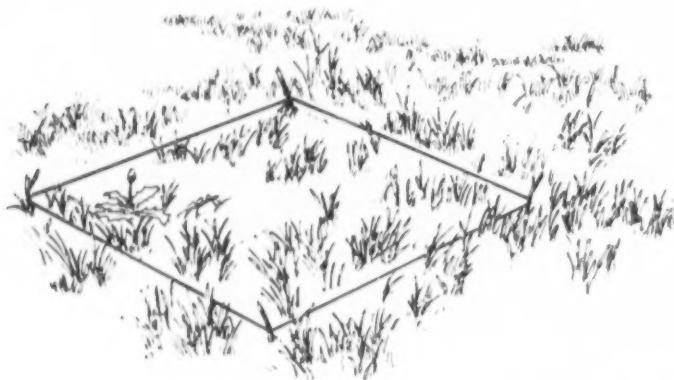
4. If you have a number of owl pellets, make a display showing the bones, teeth, fur, and feathers of the animals owls eat.



Who Lives Here?

How would the world look if you were only one inch tall? The grass in your school yard would be a wild jungle; a fallen log would be as hard to climb over as a mountain.

If you look at the world from a worm's-eye view, you will discover many plants and animals around you. With few materials and a sharp eye, you can look at wildlife in your own "minihabitat."



Materials Needed

- 4 small sticks
- an 8- to 12-foot-long piece of yarn or string
- a pencil
- a Who Lives Here Record

What to Do

1. Go to a field, forest, park, or vacant lot.
2. Push the 4 sticks into the ground 2 to 3 feet apart to make a square.
3. Mark the square by running the yarn or string around the outside of the sticks. This marks the boundary of your minihabitat.
4. Guess how many plants and animals (or animal signs) are in your minihabitat.
5. Lie on the ground to get a worm's-eye view. Count the kinds of plants you see. How many different plants can you find?
6. Count the animals and animal signs that you find. You may see a worm burrow, a feather, a fox track, a beetle, and more!
7. Write down what you see in your minihabitat on the record sheet.

Additional Suggestion

1. Choose other habitats for a worm's-eye view. Do you find the most plants in a field, brushy area, or forest? Where do you find the most animals? Take a friend on a tour of your minihabitat.

Froggie Field Trip

Have you ever found frog eggs? Or watched a swimming tadpole search for food? Or listened to hundreds of frogs singing on a warm spring night? Wildlife detectives have little trouble finding frogs. Just put on your boots and wander through a nearby wetland or swamp.

For part of their lives, frogs live in wet places—shallow ponds, marshes, swamps, slow-moving streams, and even puddles. Female frogs lay many jelly-covered eggs in the water. The animal that hatches out of an egg is called a tadpole or larva; it lives underwater and breathes through feathery gills.

Tadpoles spend most of their time feeding and growing. They munch on underwater plants called algae. The time it takes to change from a tadpole to an adult frog depends partly on how much food a tadpole finds and the temperature of the water. Different kinds of frogs vary in the time they take to change into adults (in a process called metamorphosis). A bullfrog takes a year or

more to become an adult. Some small frogs turn into adults two weeks after hatching.

Because adult frogs have lungs instead of gills, they must breathe air, and they spend little time underwater. Adult frogs usually live near ponds. Some adults live in the woods but return to water to lay eggs. Adult frogs eat insects, earthworms, fish, snakes, small frogs, and anything else they can catch.

You can find frogs at all stages of their life—as eggs, as tadpoles, and as adults.

Materials Needed

- boots or old sneakers
- a clear plastic container
- a dip net or kitchen strainer
- a hand lens
- a Froggie Field Trip Record
- a pencil

What to Do

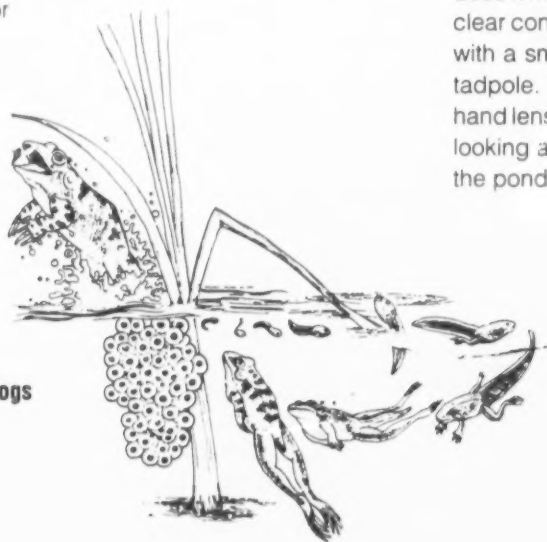
1. Visit a shallow pond or wetland on a warm day in April or May. Be sure to wear boots or old shoes.
2. Walk along the edge of the pond. (DO NOT wade in the pond.) Search first for eggs. You will probably see some large egg masses, and with careful searching you may see individual and small groups of eggs.

DO NOT pick up the eggs, because it is easy to damage the jelly that surrounds and protects them. If the eggs are near the shore, look closely at each egg. What do you see inside? Is there any movement in the eggs? Although it is difficult to tell what kind of frog's eggs you find, you may notice different types.

3. Look for tadpoles. Tadpoles sometimes swim near the shore. Those that are resting on the bottom will be more difficult to find.

When you find a tadpole, watch carefully to see what it is doing. How does it move? What is it eating? Fill a clear container with pond water, and with a small net, carefully catch the tadpole. Look at it up close with a hand lens. Can you see its gills? After looking at the tadpole, put it back in the pond.

Eggs to tadpoles to adult frogs





What Animal Is That?

4. Look for adult frogs. You will have to search carefully since adults blend in well with the mud and grasses around a pond and they sit very still. (Insects and worms that don't notice a frog may end up as the frog's dinner.)

People often hear frogs before seeing them. Most singing frogs are males looking for a mate. When several frogs at one pond sing together, their loud singing attracts female frogs. A female frog knows the call of males of her own kind (species) and only comes when she hears their song. The best time to hear frogs singing is on a damp, warm night in spring or early summer.

Plan a time when an adult leader can take your group for an evening field trip to look for frogs.

5. Write down what you see on the Froggie Field Trip Record.

As you observe wildlife, you will find animals you have never seen before. To be a wildlife detective, you must know a few facts about animal groups. Then even when an animal is new to you, you can identify it by the group to which it belongs.

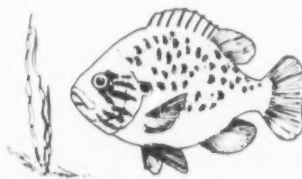
Of all the animals, the greatest number are **invertebrates**—animals without backbones. These include worms, snails, clams, lobsters, spiders, insects, and others. By far the largest group of invertebrates is that of the insects. In fact, there are more kinds of insects than all other animal groups combined.



Monarch butterfly

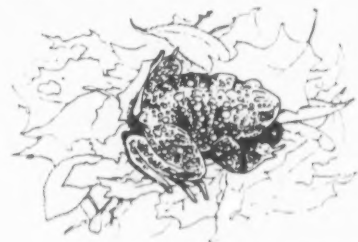
The animals we are most familiar with are **vertebrates**—animals with backbones. There are five groups of vertebrates: fish, amphibians, reptiles, birds, and mammals.

Fish spend their entire lives underwater. They breathe underwater, usually with gills. Fish swim by moving their fins.



Pumpkinseed sunfish

Amphibians lead two lives—one under water and one on land. Their name comes from the Greek word *amphibios*, which means beings with a double life. Frogs, toads, and salamanders are all amphibians. Adult amphibians lay their eggs underwater. Larvae (i.e., tadpoles) hatch from the eggs and live underwater for some time, using their gills to breathe. They grow into air-breathing adults that live on land but often swim in water. Adult amphibians have legs for walking (or hopping) on land.



American toad

Reptiles live their whole lives on land, although many swim. Their scaly skin lets them live in places that are dry. They breathe air through lungs they have at birth. Turtles, crocodiles, alligators, lizards, and snakes are reptiles. Dinosaurs were also reptiles. Reptile eggs have a thick leathery shell and they are laid on the land.



Painted turtle



Winged and feather-covered animals are called **birds**. Feathers keep a bird warm. Most birds also use their feathers to fly. Many birds build nests where they lay their eggs and take care of their young.



Blue jay

Mammals have mammary glands which make milk for their babies. Most mammals do not lay eggs; instead, the babies grow inside their mothers and are born alive. The hair on mammals' bodies keeps these animals warm. People are mammals.



Cottontail rabbit

Materials Needed

- old magazines and calendars
- scissors
- 6 index cards
- a pencil

What to Do

1. Cut out pictures of many different kinds of animals (including people) from old magazines (such as *Ranger Rick*) and calendars. Check with an adult to be sure the magazine or calendar is not being used **before** cutting any pictures.
2. Write the following names on separate cards: Invertebrates, Fish, Amphibians, Reptiles, Birds, and Mammals.
3. Ask your friends to put the pictures next to the correct cards.

Other Activities

The following activities will help you discover and study wildlife further.

1. Make a collection of animal track casts. Use a field guide to identify the tracks. Display your collection at fairs, malls, and other exhibit areas.
2. Keep a field notebook of all your wildlife observations (including your completed record sheets from this project). Share your observations with others by giving a public presentation.
3. Start a list of all the wildlife and wildlife signs that you have seen. Add to this list as you see and find more signs of wildlife.
4. Visit a nature preserve, nature center, or zoo to look at animals closely. Do animals in captivity act differently than animals in the wild? What are the differences?
5. Create a wildlife photography display of animals and their signs. You will need patience to take pictures of wild animals, but the results will be exciting and interesting.



Wildlife Discovery

Animal Tracks Record

Take a copy of this sheet with you whenever you look for tracks.

1. Describe the habitat (area where an animal lives) where you found tracks.

2. Were the tracks made by more than one animal? How can you tell? Was one animal chasing another?

3. Describe any signs you saw of an animal feeding.

4. Was the animal that made the tracks hopping, walking, or running? How can you tell?

5. How many toes were on the front and back feet of the tracks? Are any claw marks on the track?

6. What were the length and width of the track? What was the distance between footprints (stride length)?

7. Draw the track.



Wildlife Discovery

Who Lives Here? Record

Use this sheet to record what you see in each minihabitat.

1. Describe the habitat (area where an animal lives).

2. How many different kinds of plants were in the square?

3. What were the names of the plants you recognized?

4. How many animals (or animal signs) did you find?

5. Describe the animals (or signs) that you saw.



Wildlife Discovery

Froggie Field Trip Record

Take this sheet when you look for frogs.

1. Describe the habitat (area where an animal lives). _____

2. How big were the eggs? _____
3. What color were the eggs? _____
4. Describe what you saw inside the eggs. _____

5. Draw a picture of the eggs on the back of this sheet.
6. Where did you find tadpoles—on the bottom, on the surface of the water, or swimming near shore? _____

7. What was the tadpole doing? _____

8. Describe how the tadpole swam. _____

9. Draw a picture of the tadpole on the back of this sheet.
10. Where did you find adult frogs? _____

11. What were they doing? _____

12. Draw a picture of the adult frogs on the back of this sheet. How were they different from the tadpoles? _____



Resources and References

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Conant, R. 1975. *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*. Boston: Houghton Mifflin. (A comprehensive guide to the identification of eastern and central North American reptiles and amphibians.)

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Harrison, H. H. 1975. *A Field Guide to Birds' Nests*. Boston: Houghton Mifflin. (A guide to birds' nests found in the United States east of the Mississippi River.)

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Murie, O. J. 1974. *A Field Guide to Animal Tracks*. Boston: Houghton Mifflin. (An in-depth guide to the identification of animal tracks and signs.)

Peterson, R. T. 1980. *A Field Guide to the Birds East of the Rockies*. Boston: Houghton Mifflin. (An extensive guide to birds found in the United States east of the Rocky Mountains.)

Slide Sets

Mammal Identification. Instructional Materials Service, 24 Roberts Hall, Cornell University, Ithaca, N.Y. 14853. (A slide set of 47 mammal species with descriptions of each animal and its habitat.)

Our Common Amphibians. Instructional Materials Service, 24 Roberts Hall, Cornell University, Ithaca, N.Y. 14853. (A slide set showing 15 species common to New England; discusses the place of amphibians in evolution, their habitat, and how they breathe and reproduce.)

Activity Sources

Amazing Mammals Part I and Part II. *Ranger Rick's NatureScope*, vol. 2, nos. 3 and 4, 1986. (Excellent background information and activity ideas to teach youth about mammals.)

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Decker, D. J., J. W. Kelley, and R. A. Howard, Jr. 1984. *Wildlife Habitat Enhancement*. Cornell Cooperative Extension, 4-H Leader's Guide, L-5-16. (Seven activities focusing on wildlife habitat needs and enhancement.)

Howard, R. A., Jr., R. E. Bonney, Jr., and D. J. Decker. 1981. *Understanding Birds of Prey*. Cornell Cooperative Extension, 4-H Leaders' Guide, L-5-9. (Contains an excellent section on the dissection and analysis of owl pellets.)

Let's Hear It For Herps! *Ranger Rick's NatureScope*, vol. 3, no. 4, 1987. (This activity book contains background information and excellent ideas for teaching youth about reptiles and amphibians.)



Natural Resources 4-H Youth Development Program

Environmental Quality

Backyard Composting
If Fish Could Talk
Solid Waste
The Great Garbage Chase
Water Wise: Lessons in
Water Quality
Woody's Wastewise

Other

Environmental Awareness
Introduction to Field Guides
Nature Trails: Guides to
Environmental Understanding
Renewable Natural
Resource-based Businesses
for Enterprising Youth

Fisheries and Aquatic Resources

Aquatic Activities for Youth
Basic Fly Tying
Exploring Freshwater
Fisheries
Let's Go Fishing
Let's Go Ice Fishing
Sands, Oceans, and Sailors
Sportfishing/Aquatic
Resources Education
Program Manual
Water Worlds

Forestry

Backyard Maple Syrup
Firewood: From Woodlot to
Woodpile
Forestry A: Trees
Forestry B: Forests
Forestry C: Forestry
4-H Wood Sample Collection
Introducing Forests
Know Your Trees
Northeast 4-H Forestry
Project
Trees from Seeds
Tree Planting
Understanding Forest
Ecosystems
What's a Tree to Me

Wildlife

Birds in Your Backyard
Bird Study: An Introduction
to Ornithology for Youth
Bluebirds in New York
Environmental Awareness:
Wildlife
Introducing Insects
Nest Boxes for Wood Ducks
NYS DEC Pheasant Rearing
Guide
Shooting Sports
Southwest 4-H Wildlife
Projects
Trapping Furbearers DEC
Student Manual
Understanding Birds of Prey
Wildlife Discovery
Wildlife Habitat
Enhancement
Wildlife in Cities and
Suburbs

Program Philosophy and Sequence

The Natural Resources 4-H Youth Development Program provides educational programs for youth, adult volunteers, and teachers, using the research and knowledge of Cornell faculty and students. Educational materials are developed in four natural resources areas: (1) environmental quality (including water quality and solid waste), (2) fisheries and aquatic resources, (3) forestry, and (4) wildlife.

Interested youth and adults begin with awareness-level projects that encourage discovery of our local environments. They can then proceed to ecology and management projects that promote understanding of the biological principles involved in managing our natural resources. Youth with a particular interest in the outdoors are encouraged to attend the Natural Resources Youth Action Program at the Arnot Forest, where they receive intensive training in natural resources from Cornell faculty and students.

EXPERIENCE



4-H NATURAL RESOURCES

Wildlife Discovery

Beth Silverman

Janet E. Hawkes

Diane Held Phillips



4-H Leader's Guide

L-5-19

A Cornell Cooperative Extension Publication

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This project is part of a series designed to introduce youth to a variety of natural resources subjects by involving them in activities that heighten their awareness of the natural world. Leaders, teachers, and camp counselors need no background in natural resources to work and learn with youth on these activities.

Introduction

The aim of the Wildlife Discovery project is to introduce children to the needs of wildlife and to give children the opportunity to search for wildlife and their signs. This project is designed for youths aged 9 to 12. It is assumed that children and leaders have had no prior experience with wildlife.

Do not be discouraged if you have never seen an animal track or a tadpole, much less identified one! The

references listed in the member's guide will help you identify most of what you find, and it is not important to identify everything. The children in your club will be excited when they realize that you are learning with them. Encourage your club members to expand their observation skills and use references to identify what they find. You will be amazed at how much they notice outdoors.





Tips and Techniques

Field trips are most successful if you take these precautions:

1. Check out the site you plan to visit before taking your group there. Look for hazardous areas that children should avoid.
2. If you plan to go to private lands, be sure to get permission from the landowner. Inquire about any restrictions on the use of public lands.
3. Ask parents or other adults to come on the field trip. One adult per ten children is recommended.
4. Before the trip, set guidelines for the children to follow. Be sure they bring appropriate clothes, footwear, and rain and sun protection.
5. Bring a camera and binoculars.
6. For some activities, children are to work in pairs or small groups. Be sure that none of the children go off on their own.
7. When searching for tracks and wildlife, encourage the children to walk slowly and quietly. Animals are usually scared away by large groups, so you'll see more wildlife by walking quietly.
8. At the end of each activity, gather your group to share what was learned and observed. Encourage each child to talk about something he or she saw.
9. Additional activities are listed for those groups that wish to continue learning about wildlife. You will find other ideas in the references and resources listed in the member's guide and in the supplements in the leader's folder.

Additional Activities

- Starting with this project, have your group list all the wildlife signs they see. Help them use field guides to identify or confirm their sightings.
- Many club activities improve wildlife habitats. Plantings that provide shelter and food for wildlife can increase wildlife populations in your area. See the "Resources and References" section in the member's guide for suggested publications on enhancing wildlife habitats.
- Have club members explore the life history of an animal of interest to them. D. J. Decker's *Wildlife Notebook: Sketches of Selected Wildlife in New York State* (Cornell Cooperative Extension Information Bulletin 210) provides detailed information on a wide variety of wildlife species. Members can use their research as background for a public presentation, display, or written project story.
- Invite a wildlife manager or biologist, conservation officer, or other person involved with wildlife to speak to your group. A discussion of careers in wildlife management may interest older youth.
- Hold a competition based on collecting signs of wildlife with teams of club members. This could be a scavenger hunt for particular signs, or teams could be challenged to find as many signs as possible. Winning categories could include most unusual sign, biggest sign, smallest sign, or most signs. Create your own categories. A photo contest of wildlife signs would add another dimension to this activity.
- Use the supplemental projects included in the leader's folder if time is available and members show interest. The supplements are "Urban and Backyard Wildlife," "Wildlife Foods," and "Wildlife Photography." These projects are more advanced than the activities in the member's guide. Adult supervision or guidance is advised to ensure a positive learning experience.



Cornell Cooperative Extension

*Helping You
Put Knowledge
to Work*

The authors wish to thank the following faculty and staff in the Department of Natural Resources, Cornell University, for their assistance in preparing these materials: Marianne Krasny, 4-H youth development program leader; Gary Goff, extension associate; and Patty Bricker, extension aide.

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Illustrations by Dan Burgevin

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Wildlife Discovery

Who Lives Here? Record

Use this sheet to record what you see in each minihabitat.

1. Describe the habitat (area where an animal lives).

2. How many different kinds of plants were in the square?

3. What were the names of the plants you recognized?

4. How many animals (or animal signs) did you find?

5. Describe the animals (or signs) that you saw.



Wildlife Discovery

Froggie Field Trip Record

Take this sheet when you look for frogs.

1. Describe the habitat (area where an animal lives). _____

2. How big were the eggs? _____
3. What color were the eggs? _____
4. Describe what you saw inside the eggs. _____

5. Draw a picture of the eggs on the back of this sheet.
6. Where did you find tadpoles—on the bottom, on the surface of the water, or swimming near shore?

7. What was the tadpole doing? _____

8. Describe how the tadpole swam. _____

9. Draw a picture of the tadpole on the back of this sheet.
10. Where did you find adult frogs? _____

11. What were they doing? _____

12. Draw a picture of the adult frogs on the back of this sheet. How were they different from the tadpoles?



Wildlife Discovery

Animal Tracks Record

Take a copy of this sheet with you whenever you look for tracks.

1. Describe the habitat (area where an animal lives) where you found tracks.

2. Were the tracks made by more than one animal? How can you tell? Was one animal chasing another?

3. Describe any signs you saw of an animal feeding.

4. Was the animal that made the tracks hopping, walking, or running? How can you tell?

5. How many toes were on the front and back feet of the tracks? Are any claw marks on the track?

6. What were the length and width of the track? What was the distance between footprints (stride length)?

7. Draw the track.



WILDLIFE PROJECT

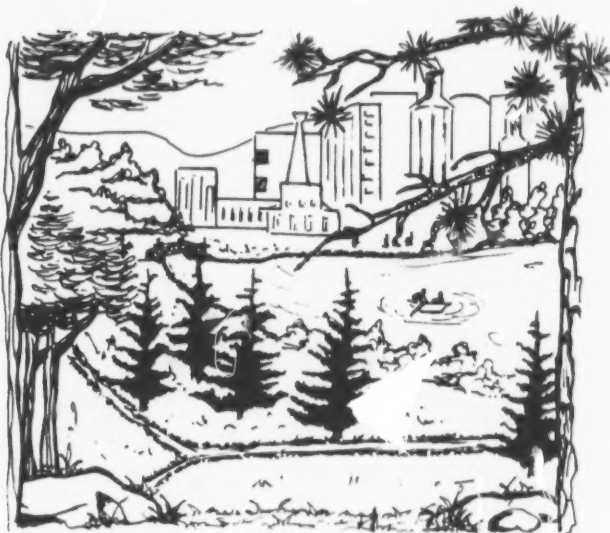
Urban and Backyard Wildlife



INTRODUCTION

Why is wildlife important in urban areas? There are several reasons. People can understand themselves better by observing and sharing space with wildlife. People can identify with wildlife. The miracle of birth and death can be experienced by watching animals in natural habitats. We can observe other natural creatures adjust to different outside conditions, just as we adjust in our daily living. By having wildlife close by and coexisting with it, people can learn that they too are part of nature.

Much can be done for wildlife in the urban environment when people take an interest and care. To help, we must know something of the needs of wildlife, have some knowledge of animal species and exercise a measure of good judgment and know-how.



WILDLIFE NEEDS

Before we can help or manage wildlife, we should learn about a few natural laws that influence wildlife. Wildlife in some form can be found almost anywhere the basic needs of food, water, cover and living space are met. This combination of food, water, cover and space is known as habitat. Animals that do not find suitable habitat conditions will either starve, be preyed upon, be unable to raise young or move to a better environment.



Little plant variety means a low variety in wildlife.

The operation of natural laws determines the success or failure of an animal in a given habitat. Natural laws are the basis for the important wildlife management principle called "carrying capacity." Carrying capacity is the number of healthy animals (any animals—rabbits, woodpeckers, etc.) that a habitat will support or "carry" at one time. The amount and quality of food, cover and water basically determine a habitat's carrying capacity. Carrying capacity is influenced by soil fertility and the way land is used. It can also be affected by the relationships between the animals themselves.

People do not influence soil fertility to a great extent. For the most part, soil fertility will be acceptable or easily corrected in urban areas. The most important way people affect urban wildlife is through land use. The best land use is that which produces direct benefits to people while conserving soil, water, minerals, plants and animal life. To achieve this, the



A yard with a variety of plants means
high wildlife variety

pattern of land use must be varied. Take, for example, a yard or a park that contains only grass . . . few forms of wildlife can prosper here! On the other hand, a diverse yard that combines fruit plants, a strip of grass and a row of evergreen trees is attractive to more different forms of wildlife, since more habitat needs are met.

People cannot produce wildlife by themselves—only nature can do this. We can, however, help wildlife by understanding and working with nature and her laws. The urban landowner can increase wildlife by following practices which will improve the carrying capacity of his land. The basic practices in wildlife management are to provide and maintain food, cover, water and living space (providing habitat).

TARGET SITES

What kind of areas are we talking about in considering urban wildlife? Do not stop with your own yard. There are many other areas that deserve attention—a nature center, a school yard, a city park, a botanical garden, a camp area, sanctuaries, bike trails, rural life centers or even a vacant lot. Each area can be approached in basically the same manner but on different scales and according to different wildlife needs.

URBAN WILDLIFE SPECIES

The wildlife you can benefit is practically unlimited. Mammals, birds, reptiles and amphibians can all be helped. Mammals could include squirrels, rac-

coons, opossums, rabbits, chipmunks, field mice, skunks and even foxes. Birds affected will vary according to where you live, but the most common are wrens, sparrows, martins, swallows, chickadees, titmice, robins, doves, flickers, woodpeckers, cardinals, mockingbirds, bluebirds, bluejays, starlings and blackbirds. Snakes live in urban areas as do turtles, toads, lizards and frogs. A host of small animals (spiders, insects and aquatic animals) will also benefit from various wildlife management techniques.

HABITAT IMPROVEMENT—WATER

For many species of urban wildlife, especially birds, a suitable water source is a prime habitat consideration that can determine the number of animals in your neighborhood. In attempting to control mosquitoes many cities or towns have drained or filled areas that provided watering and bathing area requirements for animals.



Bike trails make ideal wildlife hab



Water for drinking and bathing is an important habitat requirement.

ACTIVITY I—NEIGHBORHOOD WATER SURVEY

Take a walk through your neighborhood and write down the location of available water sources for birds within a three block radius of your home. Careful attention should be given to locating land depressions with standing water, buildings with flat roofs or faulty gutters that might collect rain water, and any free-running seeps, creeks or canals that might be nearby. Once you have completed your survey, analyze the types of water sources you were able to find. You might ask yourself these questions:

1. Is this source of water a reliable year-round water source or does it evaporate in hot weather or freeze over in cold weather?
2. How much water is available? Does there seem to be enough for many animals?
3. Can the water supply the needs of the animals throughout the year?
4. Is the water clean or is it polluted with oil residue, salts or runoffs from a factory?
5. Does the water smell funny or have slimy rust brown growth of bacteria in it (sure signs of sewage contamination)?

If the analysis of water resources reveals a water shortage in your neighborhood, what can you do to help meet this need?



ACTIVITY II—ESTABLISHING AND MAINTAINING A BIRDBATH

In order to increase the availability of water, birdbaths can be placed in your urban area. Birds enjoy splashing around, and when they gather for this activity it is usually a circus-like affair that can be both informative and entertaining.

Birdbaths can be constructed in many ways and almost anything that holds water will do. By constructing baths you will provide a means for birds to keep clean and free of some parasites, as well as providing them with necessary drinking water.

A cut tire in a tree makes
an inexpensive bird bath.



Materials

The following are all that is needed:

- old trash can lid (no holes, preferably steel)
- old car or truck tire (no holes)
- paint and brush
- tie wire, wire cutters
- drill and hacksaw
- 2" x 4" treated lumber 12 feet long (unless birdbath is to be mounted in a tree)



Garbage can lid, weighted with
bricks on a section of drain tile.

THE ACTIVITY PLAN

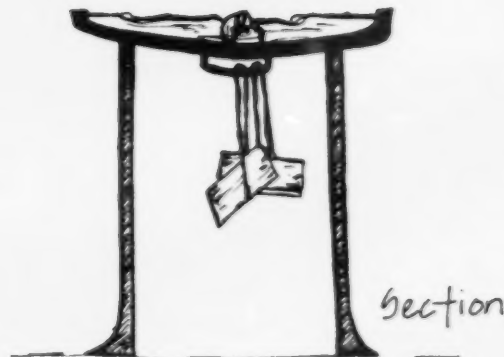
To begin you must select a site to erect your birdbath. An area where different birds congregate is a worthy selection. Most likely you will choose your own yard so you can watch the birds. Do not forget any of the areas mentioned previously.

Your water containers can be simple and inexpensive. Examples are an old trash can lid or an old tire cut in half. The tire can be cut in half with a hacksaw. Cut it in half down the middle tread.

To prepare your container (either the lid or tire), you will need to drill three sets of holes around its lip. At each site drill two holes an inch apart from each other and one-half inch from the container edge.

Now you are ready to set up the bath. Locate the bath container on a low fork of a tree. If not available, you can either hang the container down from a tree limb or support it on 2" x 2" stakes (three stakes, four feet long). To fasten the container securely to its support, run tie wire through each set of holes and around the tree body, tree limbs or wooden stakes whichever is the case. Twist the wire ends tightly.

Now simply fill the container to a depth of two and one-half inches. Anything deeper will cause birds to avoid the bath. Remember to maintain the bath by keeping a water supply available and cleaning the container inside to prevent algae buildup. A well-tended birdbath should reward you with many bird watching opportunities as well as providing the birds with a needed place to drink.





A garbage can lid weighted with bricks on a pile of rocks or rubble.

HABITAT IMPROVEMENT-FOOD

Winter is a particularly hard time for birds in the urban habitat. During this season, food supplies are at their lowest and even water can be in short supply. (A bird cannot drink an ice cube.)

Some people provide bread crumbs for their bird friends during the winter months. This is not a balanced diet. Other foods are easily obtained and are beneficial to typical urban birds. (You may want to obtain a copy of the 4-H Wildlife Activity Guide to Birdhouses and Bird Furniture.)

ACTIVITY III—BIRD FEEDING PROGRAM

Identify 10 birds that you have seen in your neighborhood during the winter. Put their names in Table 1 to the right. Study their feeding habits in your yard and at a bird feeder. Put the foods that they select in the table beside the bird's name for easy reference later.

The foods you list in Table 1 can be incorporated into your winter bird feeding program. These same foods are liked by other birds, too, and may help to attract new species of birds into your neighborhood.

ACTIVITY IV—BUILDING A BIRD FEEDING STATION

You may ask "what is a bird feeding station?" It is any protected place where birds can come to a clean, reliable food source in winter. Let's look more closely at this definition. Several things are extremely important. The key words here are "protected," "clean," and "reliable."

Protected means an area not so much free from wind and rain (although this is desirable) but especially one free from bird predators. If you are feeding birds, it's hopefully not to fatten them up for the free-roaming neighborhood cat. Therefore, any time you construct a feeding station you must pay close attention to its location so that the feeding birds can be as safe as possible. A sunny area with bushes nearby provides cover and protection from predators. If you're planning to do some bird watching, an area where the sun is to the viewer's back is best so that color markings will show up. A feeding bird viewed into the sun shows up as a dark silhouette.

Table 1

Neighborhood Bird Food Chart

Name of Bird	Foods Preferred
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

BOTTLE FEEDER



- 1 one empty gallon plastic mayonnaise jar from school cafeteria.



- 2 cut several holes



- 3 turn upside down and hang up with rope through hole in bottom of jar, tie a large knot to keep rope from slipping out. Fill with seeds.

Our second word, "clean," is important. Food that has remained too long in feeders will mold and spoil just as your food would. Spoiled food can poison birds or even kill them. Be sure to discard any foods that become discolored or smelly. Also, clean your feeders regularly.

The third key word, "reliable," is perhaps the most important. Birds soon become accustomed to receiving daily handouts. In severe weather when it is least desirable for you to get out, is the time they need you the most. This is because birds need more food to supply their bodies with warmth to enable them to withstand the cold. Without a reliable source of food, birds dependent on your feeding station may not survive. Always keep a good supply of food in your station. If you have to be away for any length of time, ask a friend to keep the station filled with food while you're gone.

With warmer weather, stop your feeding program. Remember, we are dealing with wildlife. Year round feeding will turn our bird friends into pet-like parasites, totally dependent upon us for handouts and survival. You needn't worry about the birds coming back next winter, for word soon gets around where the food is to be found.

Your station itself should consist of several small feeding areas. Many people spend a lot of money on a fancy all-in-one station that they hope will meet the needs of all the neighborhood birds only to find that their larger station attracts only the "bully" birds of



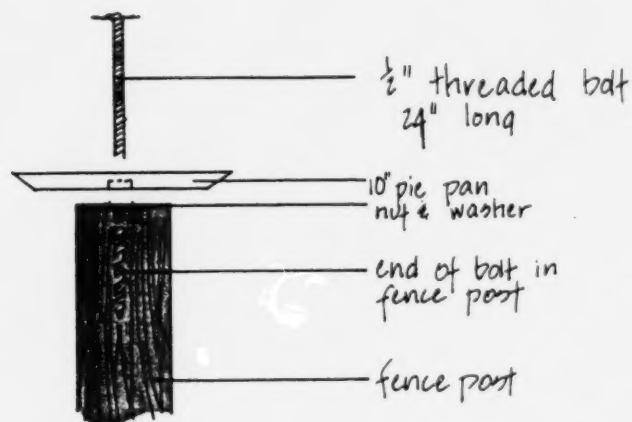
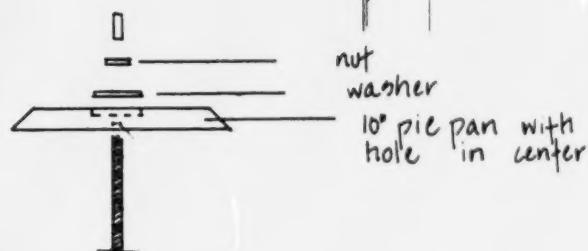
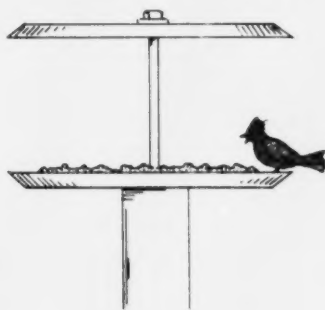
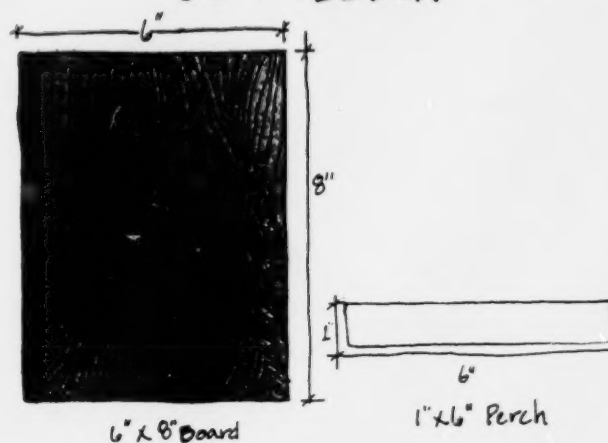
baffle caps
nailed to boards

To use: fill caps with peanut butter mixed with ground suet and seeds - hang up.

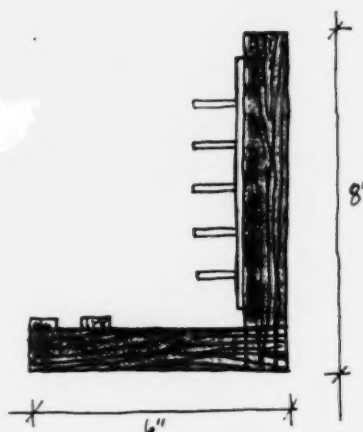
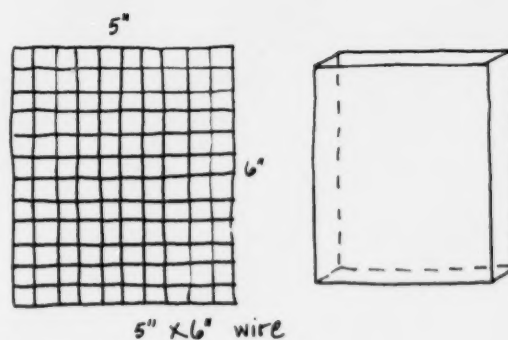
BOTTLE - CAP FEEDER

the area. These so-called "bullies," the bluejays, starlings and evening grosbeaks, will fight the smaller birds for the ownership of the station. Because of their strength and size these larger birds will usually succeed in driving away the smaller birds. To make the station attractive to all kinds of birds, provide a variety in the feeding areas. Small feeders without porches are good places for small grasping birds to feed. Feeders placed low to the ground will attract ground feeding juncos and sparrows. Larger above ground feeders will draw in cardinals, woodpeckers and other larger birds. Meat-eating birds such as woodpeckers and starlings enjoy a piece of suet to peck on. The illustrations on these pages show how you can assemble your station to provide food for many of your neighborhood birds. Select and build the types of feeders that you feel will best meet your needs.

SUET FEEDER



POLE FEEDER



Construction method: Nail 1" x 6" strips to side of board, attach cross strips for perch, attach wire suet holder or soap dish - to use slide strips of suet into holder and hang up.

HABITAT IMPROVEMENT-SHELTER

A proper living site is very important to animals. Without proper shelter, animals cannot survive and raise young even though food and water needs are met. Within the urban environment we can improve the habitat of wildlife if we understand some important concepts about predators and prey.

Predation is important in nature. Predation is the act of one animal killing another for food. The predator (hunter) seeks out the prey (hunted animal) for food to survive. One animal preys upon another and it, in turn, can be preyed upon by still larger animals



Can you identify which of these animals is the predator?

in a continuing chain of events known as a *food chain*. Within the urban environment the wild natural predators have been replaced by their domesticated counterparts. Wolves, coyotes and foxes have been replaced by dogs. The larger wildcats, such as the bobcat, the mountain lion or the panther have been replaced by the house or alley cat. The biological role of these animals is the same as their wild cousins. They are top carnivores—the last link in the food chain. These domesticated animals therefore naturally have a diet of meat and feed on urban wildlife.

Predation in nature is good from the standpoint of weeding out the sick, weak or injured members of a group of animals. It is easier to capture a sick animal than it is to capture a well one. As a result, the sick, weak and injured are captured, killed and eaten by a predator next in line up the food chain. The predator benefits because it obtains food; the population of animals being preyed upon benefits by having the sick and the weak eliminated. Predators also help keep the prey population within the carrying capacity of the habitat.

In nature a balance is achieved between the predator and the prey. If too many predators are running

around loose, then more prey are destroyed until the population of prey is too low to support that many predators. As a result, the predators either move on to other areas or stay and starve. Either way the number of predators in the area will be reduced. The remaining prey are then allowed to rebuild their numbers. As more prey appear the number of predators will increase due to the increased food supply; and so the cycle begins again. As long as a few prey and predators remain, the cycle will continue and the balance of nature will be achieved. If, however, all the prey or predators are destroyed, the balance cannot be maintained.



Free roaming dogs and cats are a threat to urban wildlife.

Table II

A Survey of Neighborhood Predators

PREDATOR SURVEY					Date		
Animal		Location	Sex		Health	Age	Condition
Dog	Cat		Male	Female	sick, hunger, well, injured, blind, expect- ing young	pup kitten young full grown	collar tied loose

ACTIVITY V—PREDATOR SURVEY

Within your neighborhood count all the cats and dogs roaming around loose during a three hour period in an area of one block. Note the location of animal, its sex if possible, its general age and general state of health. A table such as the one above might be useful . . . or invent one of your own.

From your survey and other sources, answer the following questions:

1. What type of animal is most often seen predating in your neighborhood?
2. How many of the loose animals seem to have homes?
3. How many animals appeared to have litters of young?
4. Did you see any evidence of predation (dead, half-eaten prey, feathers, piles of bones, fur)?
5. Does your neighborhood have a leash law regarding stray animals? If so, what is it? (Contact police information or city hall.)
6. Does your city operate an animal shelter for stray animals? If so, what happens to these animals?
7. Did any of these observed animals wear bells to warn other animals of their presence?
8. During your survey did you see any of the animals actively hunting other animals?
9. What might you conclude is the state of the predator population in your neighborhood? Does it pose a serious threat to increasing wildlife numbers in your community?
10. What suggestions or recommendations do you have that might help combat the problem? To whom should these suggestions be made? Can you as an individual do anything? What about your own pet?

NATURE SANCTUARY

How might an area be made safer for wildlife? You may have already touched upon this in the preceding activity. One thing that we might consider is that an animal with a safe place to hide is less likely to be attacked than one in the open. Efforts to provide safe nesting areas for young, free from predation, should increase wildlife numbers by reducing the number of young lost. You might say then, "how might I provide safer living and nesting areas for wildlife?"

ACTIVITY VI—CONSTRUCTING
A NATURE SANCTUARY

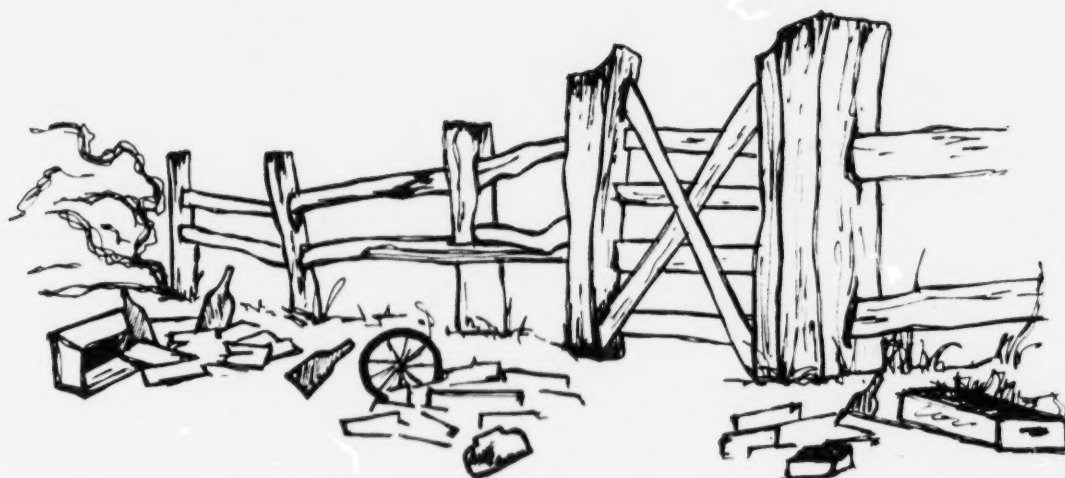
In a portion of your yard, a portion of a park or an abandoned lot construct a nature sanctuary. A sanctuary is an especially protected area where we can attempt to improve food, water and shelter for wildlife.

First, get permission to use the land from its owner—private individual, park personnel or your parents. Describe what you want to do, what you hope to achieve and how and when the work will be accomplished.

Once you have permission, you're ready to begin. First you need to investigate what you have to work with. If your area is trashy, clean it up first. Determine what major animal types you could attract to the sanctuary (birds, squirrels, rabbits).

Make note of any shrubs, bushes or trees you might have growing in your sanctuary area. If there are some already, you're lucky. Now do some planning. For example, consider a bare, vacant lot.

If no water is available at the site, the construction of a ground level birdbath (see birdbath activity) may be wise. The choice of a ground level birdbath would allow use of this water source by small mammals as well as birds.



A future site of a nature sanctuary.

Once water considerations have been taken care of, it is time to consider food. A well-established nature sanctuary would contain a variety of growing plants to provide food and shelter. Because there are no plants, you'll have to start with free-standing feeders or hanging feeders on poles. To provide variety, several types of each can be used.



A ground level water source, a pole feeder with a variety of feeders and, a squirrel feeder platform.

One squirrel feeding platform (provided you do have squirrels) and two bird feeders might be enough to make up your sanctuary feeding station. A hungry squirrel can eat a lot of bird food, so try to bribe them with some favorites of their own.

The squirrel feeding platform can be merely several boards fastened to the top of a post with a rim of wood around the edge to help contain the peanut hulls. To conserve as much as possible on posts, a hanging bird feeder can be attached to the side of the post bird feeder. Once filled with food, the feeders should start attracting wildlife visitors. Trash hulls and wasted food from squirrels or birds should periodically be removed from the feeding area. This is done to insure fresh clean food for visiting wildlife, as well as to reduce the chances of drawing rats to the sanctuary area.

You've taken care of two of the three requirements for wildlife—food and water. It is now time to consider putting in some plants for shelter and protection.

Large shrubs and small trees are not only beautiful but also provide excellent shelter for wildlife. Sometimes you can find neighbors or friends who want to thin out what they already have. Sometimes city park systems have seeds or plants for beautification projects that they might let you have. Remember, it doesn't hurt to ask! Also, you might keep an eye on houses that are being torn down or streets being widened, in case a lot of plants are destroyed and hauled off to the dump.

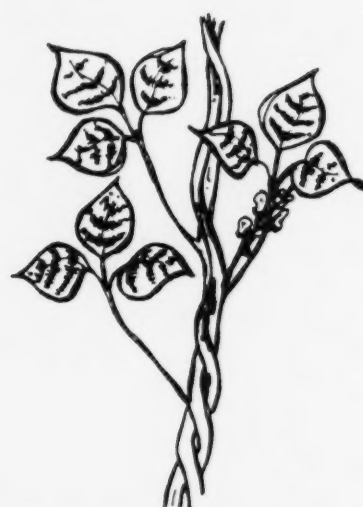
Some wild plants are easily adapted for use in nature sanctuaries. These might be located and moved



Fast growing groundcovers such as *lespedeza* provide attractive low cover



Some plants such as sunflowers provide both food and shelter.



Running vegetation can be used to provide shelter.

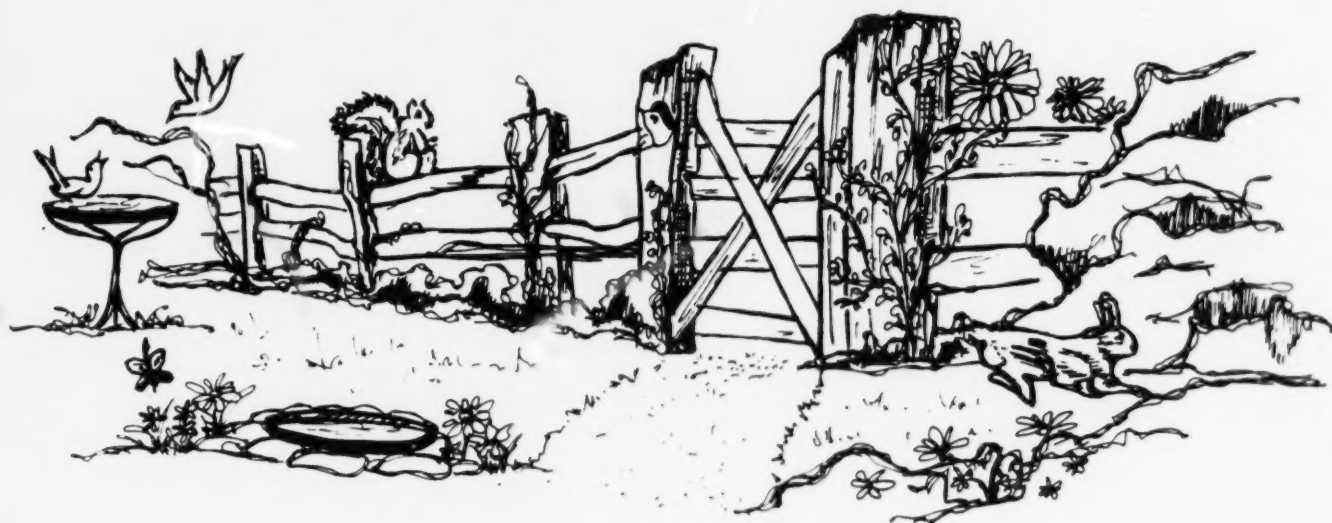
to the sanctuary site. For information on what will grow in your area to provide shelter and food for the sanctuary, consult your local county Extension agent. He has information on using these kinds of plants.

Some other plants you might consider are *lespedezas*, a rapid-growing ground cover often planted along roadsides. They can be planted toward the rear of the sanctuary for both food and shelter. A row or two of tall-growing sunflowers can be used to outline the sanctuary's rear boundary. Pumpkins, cantaloupes or watermelon vines near the birdbath will provide a low, fast-growing ground cover. These vines will

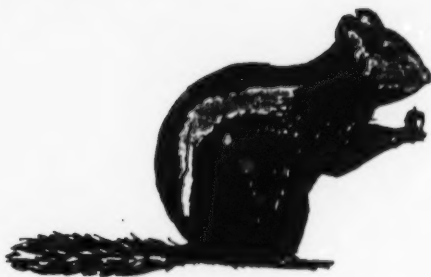
soften the appearance of the area as they grow and should remain low enough for wildlife to see any approaching danger.

Care taken in the selection of plants for the sanctuary will give an inexpensive and easily maintained array of plants that should help to draw in our animal friends.

A neatly lettered sign stating the name of your community or club followed by "Nature Sanctuary" is all that is still needed to officially declare your neighborhood's concern about its urban wildlife through urban wildlife management.



Finished wildlife sanctuary



A well managed wildlife area
provides living space for creatures
both large and small.

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Some material in this guide was adapted from existing 4-H literature.



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Wildlife Foods



INTRODUCTION

Most plants and animals serve as food for some other living organism. Game birds and songbirds eat seeds, fruits, nuts, berries, and insects. Herbivores—like the rabbit, woodchuck and deer—eat herbs, grasses, leaves, twigs, and other plant material. Bobcats are carnivores, or meat-eaters. They feed on rabbits, woodchucks, mice, birds, and sometimes young or weak deer. Animals which feed on both plants and other animals are called omnivores. Foxes and bears eat berries, fruits, vegetables, insects, mice, birds, chipmunks, and rabbits.

To provide food for wildlife or attract wildlife to an area, we must know what foods a particular species likes. The purpose of this activity is to make you aware of some of the wildlife foods, their seasonal availability, and their uses in our area.

PLANT AND ANIMAL FOODS FOR WILDLIFE

Not only are many kinds of plants utilized by wildlife, but nearly all parts of the plants are eaten by one animal species or another. Fruits, seeds, leaves, twigs, bark, stems and roots furnish food to different kinds of animals. Browsing and grazing mammals, some rodents and a few gamebirds make the vegetative parts of plants a major part of their diet.

*Illus. 1*

The fleshy fruits, rich in carbohydrates and vitamins, are especially important, relished foods. Fleshy fruits are mainly the products of woody plants and are generally available in summer and fall; but some fruits, like holly, grape, persimmon, gum and hackberry, persist into the winter.

Seeds and nuts are concentrated food parcels unusually rich in fats and proteins and are available over long periods. Grasses, weeds, and particularly first succession plants, produce a tremendous volume of food used by many birds and small mammals.

*Illus. 2*

Nuts are usually considered to be tree fruits with dry hard exteriors. Dry fruits of woody plants are sometimes classed with nuts under the ambiguous name of "mast." All seeds and fruits of trees are good sources of nourishment for wild creatures but none are more important than the acorn. A season where there is a heavy crop of acorns

is known as a "mast year" and wildlife, especially forest-dwelling animals such as deer, bear, wild turkey, squirrels and small rodents, as well as many woodland-type birds, live as if on a banquet table as long as the supply holds out. A bumper crop of acorns enables woodland wildlife to prepare physically for the winter season ahead. By storing up excess fat in their bodies, they are better able to live through the winter and be in good physical condition to rear their young in the spring.

*Illus. 3*

Very little is known about the interpretation of wildlife food preferences. A number of factors may enter into it. Certainly, both availability and nutrition value are important factors. For instance, seed-eating birds switch to insect feeding of their young when insects are plentiful during the early summer. Further, the nutritional needs of the animals may unconsciously make them select foods to meet their deficiencies. Still another factor, especially among browsing animals, is palatability—the taste of the food. It is not surprising that these animals prefer



Illus. 4

soft, succulent leaves to leathery ones and often pass by plants with bitter or milky juices. Meanwhile, some poisonous plants seem to be avoided instinctively.



Illus. 5

fast enough to catch fish. A kingfisher may keep watch from a branch, waiting to plunge head first into the water and seize a fish with its long pointed bill. The osprey, though he doesn't usually become completely submerged, will extend his feet and talons into the water to catch fish. Night hawks have large mouths with stiff bristles at the corners forming a funnel to aid in catching insects as they fly at night.



Illus. 6

The soaring hawks have broad wings for ease in staying aloft while they search the ground below for mice and squirrels. The owls are relatively slow flyers with their silent moth-like flight. This is an adaptation that allows the owl to glide noiselessly through the forest and over the fields. It can capture roosting birds and nocturnal rodents before they are aware of its presence.

Bobcats and foxes have sharp-edged teeth adapted to shearing and cutting meat so that it can be swallowed. Bobcats' claws are also adapted for holding prey.

You now know of many foods used by wildlife. If you were not aware of it already, you are by now beginning to suspect that the use of foods in nature forms a kind of cycle. This is known as a "food chain."



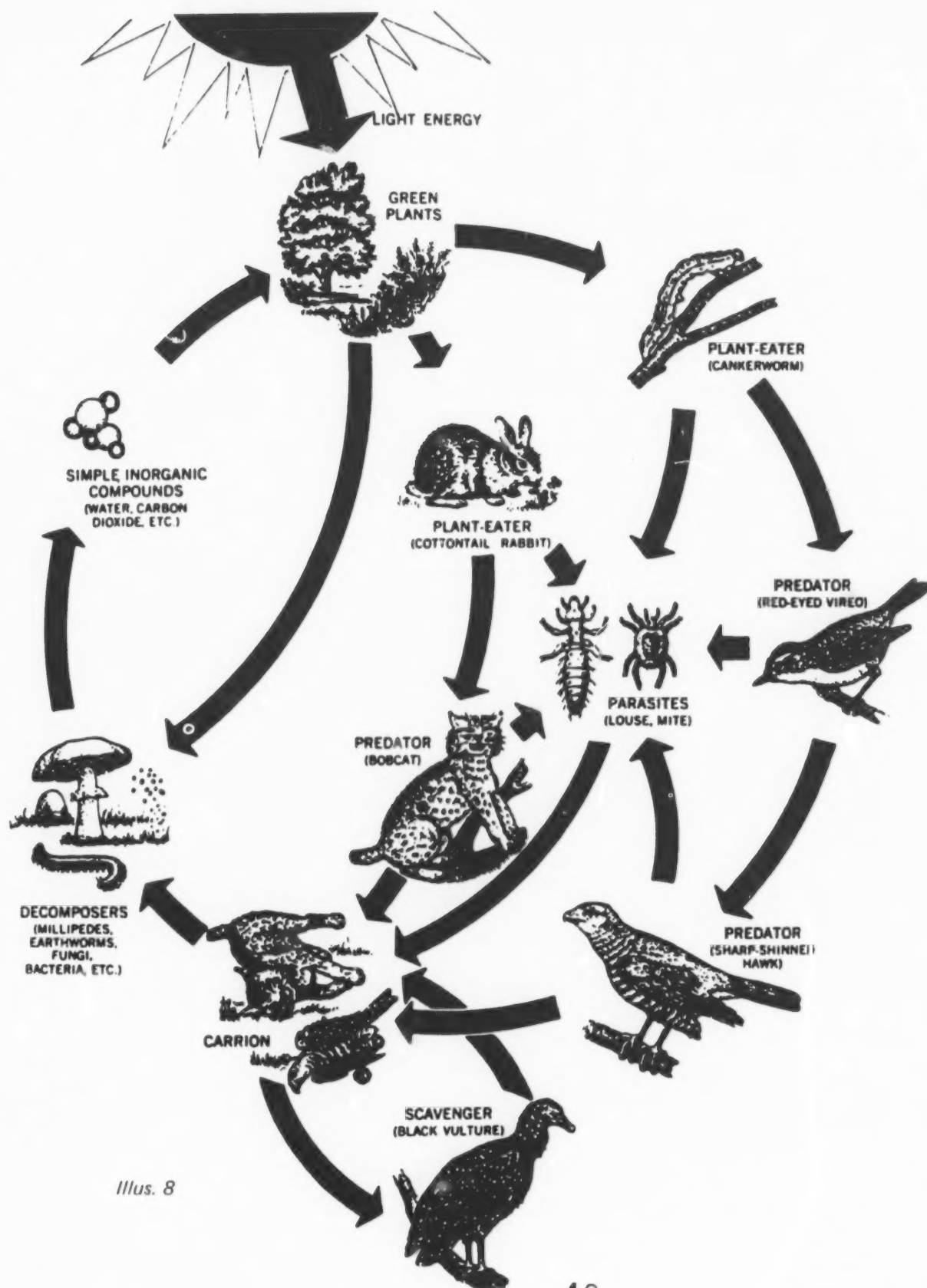
Illus. 7

THE FOOD CHAIN

Food chains are complex in any animal community. Several food chains make food "webs" and are interconnected in many different ways. You can probably recall many different food webs from your own experience. The grasshopper feeds on grass; birds and frogs eat the grasshopper; snakes eat birds, frogs, and mice; hawks and owls will eat other birds as well as snakes, frogs, and mice; when the hawk or owl dies, its body is fed upon and decomposed by worms, fungi and bacteria; worms, in turn, are eaten by birds; nutrients returned to the soil in the decay process are used in plant growth, and so it goes. If you were to try and connect green plants with a number of animals by lines representing their feeding habits, you would have a very tangled series of lines. Illustration 9 is that of a simple food web. After a little thought, it will become obvious that every living thing is indeed dependent on other living things for a source of food or nutrients.

SEASONAL AVAILABILITY OF WILDLIFE FOODS

Wildlife use of a food depends, in part, on how much and when the food is available. Unfortunately,



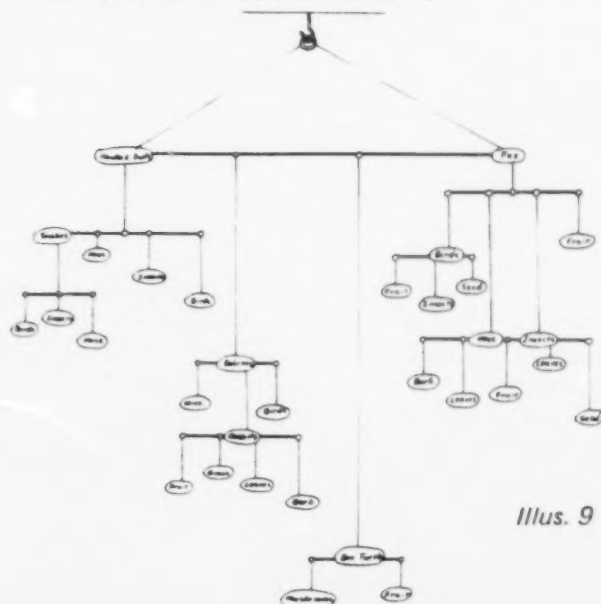
Illus. 8

food supplies are not constantly available for wild creatures. Many birds and mammals live under seasonal threat of starvation. (This was also true of man centuries ago before he learned to use tools.)

Winter is usually the most difficult time of year for all forms of wildlife. There are fewer green plants, fruits, and insects available at this time. Many seed producing plants are not available in winter. Plants or seeds that persist through the cold months may be covered by snow or ice. Predators suffer a loss of food when the plant-eating animal population is lowered as a result of starvation. It is obviously not enough that wildlife have a good supply of food during *most* of the year. If wildlife survives, it must have a sufficient supply of nourishing food all year around.

THINGS TO DO

1. Let a small portion of your yard grow up into weeds. Make a list of the plants which are found there and the species of birds or other animals which visit the area.
2. Make a mobile (a kind of movable sculpture made from thin forms, rings, rods, etc. and suspended in mid-air by thin wire or string) of wildlife creatures and their foods. Each "arm" of the mobile should have a drawing, picture or papier-mache form of an animal. To each animal form, attach dried samples of plant materials or pictures of animals which are used for food. Label each kind of plant material or animal used. You will probably use wire or string in making the mobile. Use your imagination in its design. Display it at a 4-H meeting, school, or some other function. (You may want to use a mobile to demonstrate a food chain or web.)
3. Read at least one book or article that has to do with wildlife foods and report on it to your 4-H group.
4. Make bird Christmas trees. Gather large pine cones and mount them individually on a wooden base. Melt beef suet and pour it over each pine cone. Add dabs of peanut butter. Set them on window sills and observe the birds which feed there. Display one of these cones at a 4-H meeting or school along with pictures or names of the birds that use it.
5. Diagram a food web for plants and animals found in your area. Make an attractive poster of this and include pictures or drawings of the plants and animals.
6. Write a report for your 4-H group describing examples of food competition between several species of wildlife in your area.
7. Make a series of posters with drawings or pictures of local wildlife and their foods. Include birds, herbivores, carnivores, and omnivores. Label each animal and its food.
8. Determine what forms of wildlife are in your area and plant seeds for appropriate wildlife crops close to brushy cover. When your "crop" is up, observe the kinds of birds and other animals which feed there. Exhibit samples of the seeds or dried plant materials along with the names or pictures of the wildlife which you observed. You will find books in your local library which will tell you what kind of foods are preferred by certain species of animals. (Some foods are listed in this booklet.)
9. Make a feeding station to provide extra winter food for wildlife which visits your yard. Observe the feeding at your station. Report to your 4-H group on the kind of station, food, and wildlife with which you worked.
10. Select three or more forms of wildlife that are found in your area. Write a thorough report on how each of these is adapted to capture, eat, and digest its food. Make displays of drawings or pictures which will illustrate your report. Include at least one herbivore, one carnivore, and one omnivore in your study.



Illus. 9

11. Collect and identify seeds of three or more grasses and 10 or more weeds. Make a display of your collection, including the name of each seed and the species of animals which use it for food. You may want to include dried pieces of plant material and drawings or pictures of appropriate animals in your display. Follow these instructions.

You will need:

20 small plastic or waxed-paper sandwich bags

Ball of string

Plain paper

Scissors

20 vials with caps—about two inches high and three-fourths of an inch in diameter (pill vials are good)

Small funnel

Vial stand (drill a seven-eighths inch hole in a block of wood to hold vials, or attach to board as shown in drawings)

Pencil

Small can of moth crystals

Magnifying glass

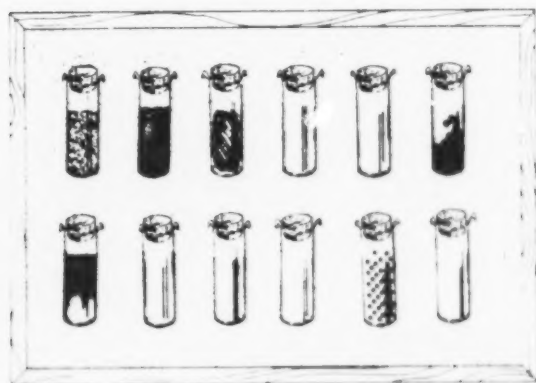
Cellophane tape

Pointed tweezers

Two cigar boxes

Rubber bands

Newspaper or paper towels



Illus. 10

Collect Seeds:

Take only ripe, dry seeds. In the field, identify those you know by recognizing the seeds themselves or the plants from which they came.

Put your seeds in small plastic bags. Put the seed-head in the bag, if you like, and shake the seeds off, or pick the seeds and drop them in the bag. Place only one kind of seed in each bag.

When you identify a seed in the field, make a label. Write (in pencil) on a piece of paper the name of the plant, date collected, location, elevation, and habitat (such as a meadow, edge of woods, creekside). Put the label in the bag with the seed. Wrap a rubber band around the mouth of the bag.

If you find a seed plant that you cannot identify, collect and label the seeds in the same way, but give the seeds a code number rather than a name. For identification, also collect and preserve the plant. When you collect a plant, label it exactly as you labeled its seeds. Tie the label on the plant.

Identify Seeds:

Choose one of the bags that holds seeds you identified in the field. Pour the seeds onto a piece of paper. Remove all trash, leaves, and other foreign materials. Look carefully at the seeds through a magnifying glass so that you can learn to recognize and identify them in the future. Check your identification against a reference book. Put a vial in the stand. Put the funnel in the vial mouth and pour in the seeds. Add two or three moth crystals to prevent insects from damaging the seeds. Make a label with all the information on the original label and put it in the vial. Replace the cap on the vial.

When you have prepared all the identified seeds, do the unidentified ones the same way. Keep your reference books nearby. The only difference will be that the label you put in the vial will have a code number rather than a plant name. For identification, you should also collect and preserve the plant, giving it the same code number as its seeds.

Place the two groups of vials in separate cigar boxes, one marked "identified seeds" and the other, "unidentified seeds."

After you have taken care of the seeds, identify the plants you collected. Use the reference books, or ask someone for help. When you identify a plant, take the seed vial with the same code number from the unidentified seeds, put an identifying label in the vial and store with the identified seeds. You may discard the plants after they are identified.

Make a Record:

After you have identified the seeds, make your list of seeds and the animals that eat them. You may

Name of seed plant	Where found (habitat type)	Animals that eat the seeds

Illus. 11

need to ask for help with this. The sample record sheet above shows the information you need to give for each kind of seed.

12. Collect and examine the crop contents of 10 doves or 10 quail. (The crop, or craw, is a food storage pouch located just in front of the bird's breast. It is under the base of the neck and forward of the wishbone. You may be able to obtain the crops from a hunter.) Identify and list the seeds you find in each crop. Make a reference collection for display to your 4-H group. Follow the instructions:

You will need:

Crops

10 small plastic or waxed-paper sandwich bags

Scissors

Several vials with caps—about two inches high and three-fourths of an inch in diameter (pill vials are good)

Teaser (force the blunt end of a needle into the eraser end of a pencil or the end of a sucker stick)

Plain paper

Pointed tweezers

Magnifying glass

Small funnel

Vial stand (drill a seven-eighths of an inch hole in a block of wood to hold vial so it won't tip over)

Pencil

Small can of moth crystals

Rubber bands

Prepare the Crops:

Make a label to keep with each crop, showing the sample number you assign to each crop, the species (dove or quail), and the date it was killed. Write in pencil.

You can prepare the crops at once or store them in plastic bags in the refrigerator. They may spoil if stored for more than a few days. To prepare a crop for examination, cut it open and transfer the contents to sheets of paper. Keep the label with the contents. Do not mix the contents of different crops. Dry the contents thoroughly, and then store them in a vial with the label.

Separate Seeds Into Kinds:

Place the dried contents of a crop on a sheet of paper. Using your tweezers, magnifying glass, and teaser, separate the different kinds of seeds into groups. Put each group in a separate vial. Make labels exactly like the original and put one in each vial.

Follow the same procedure for all 10 crops. Put a rubber band around all vials containing seeds from one crop. Now the contents are ready for analysis. You can do this immediately or later.

Identify and List Seeds:

First, study the reference books so that you will recognize seeds you find. If you have made a seed reference collection you will want to check your seeds against that. If you cannot identify a seed, ask someone for help. If you still cannot identify a seed, record it by its code number.

Bird species	Crop number	Date killed	Crop contents and percentage of each type of seed

Illus. 12

When you have identified or coded all seeds, make a list of seeds found in each crop, giving the information specified in the sample on page 6 (Illus. 12). When your list is finished, you may add the seeds to your seed reference collection. Take all the vials containing the same kind of seeds, combine them in one vial, and label it. Do the same with the other vials.

13. Write a paper concerning the seasonal changes in plants available to wildlife. Discuss the effects of seasonal changes on specific wildlife forms. Record how many kinds of plants are available (you may identify these if you wish). Note fruit and seed production and compare it from season to season. What changes take place? When is food best? When is shelter or cover best? Does this correspond with wildlife reproduction times? What plants provide food and shelter year-round? What is the most critical time of year for wildlife in your area? You may want to design posters or charts which illustrate your paper. Present your report to your 4-H group.
14. Plant trees or shrubs which will provide natural cover and food for songbirds in your backyard. Sketch the area before and after your work. You may wish to write for "Invite Wildlife to Your Backyard," Backyard Wildlife Program, National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C. 20036. You will also find helpful books in your local library as well.
15. Prepare some wildlife foods for your own consumption. Some examples are: watercress salad, fruit and nut salads, rabbit stew, and marinated quail. There are several cookbooks which give recipes for game animals.
16. Make a study of foods consumed by predators. Cut open the stomachs of two or more predators and examine the contents. Try and identify any bones, hairs, or other body parts that you find. Your predators might include certain fish, opossum, bobcat, foxes, or snakes. These animals should not be taken for their stomach contents alone. If you have no other use for them, try to obtain the stomachs from a hunter or take advantage of road kills. If you can locate owls in your area, look for owl pellets. These are wads of bone, hair, and other indigestible materials regurgitated by the owl after feeding. Make a report of your findings to your 4-H group. Display the dried food materials or pellets. Identify all food materials as closely as possible.

WORDS TO KNOW

- Adaptation*—the process by which an organism becomes better suited to its environment
Carnivore—an animal that feeds on other animals
Herbivore—an animal that feeds on plant material
Omnivore—an animal that regularly eats both plant and animal material
Predator—an animal that kills and eats other animals

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Wildlife Photography

Photographs are an excellent way to record information and to tell others about your activities. Pictures add a great deal of interest to exhibits and talks you give about your project.

You don't have to take pictures of the animals themselves. Take photographs of habitats, dens, signs, or plantings. If you want to photograph animals, a greater investment of time, effort, and money will probably be necessary to get good pictures. It may be a worthwhile investment, however, because you can't help but learn a great deal about animals as you photograph them.

This section will give you ideas about how to use photos in your wildlife project regardless of the type and cost of camera and equipment. No effort is made in this project to introduce you to the subject of photography. To expand your knowledge of photography read the books at the library, bookstore, camera store, and in the 4-H Photography project. For further information and skills you should get help from someone whose hobby is photography, or take a course at a camera shop, community center, or community college.

GENERAL SUGGESTIONS

In addition to basic techniques, there are a few things you should keep in mind when you take photographs for your wildlife project.

Get as close as you can to the subject without getting it out of focus.* This is especially true of small items such as tracks, nutshells, and so forth. This will make the subject — the purpose of taking the picture — as large as possible in your picture.

Don't try to get too much in one picture. It's better to take two good pictures than one poor picture.

Take notes as you take pictures. They make a good permanent record of your activities as well as a means of improving your photography.

- #1 9:00 a.m. (date) nutshells on rock near bird feeder
- #2 9:30 a.m. (date) bluebird house showing nearness to open field
- #3 10:00 a.m. (date) raccoon footprints near stream

Before you take a picture, think carefully exactly what you are trying to show. Write this in your notes. Then be sure your picture will show what you want. Take more than one picture to be certain.

You may not be able to show all you want to unless you have a closeup lens. If you're not ready for that investment, use written notes and sketches to record details too small to show in your pictures.

Side lighting is usually better than front lighting for small objects because details show better when shadows show on one side or the other.

*If you have a simple camera and want to find how close the subject can be without being out of focus, do the following test: Lay 3 yardsticks end-to-end on the ground. Take a picture of them with the camera a few inches above the end of the end of the yardsticks.

When you get the picture back, the inch markings nearest the camera will be out of focus, but those further away will be in focus. The nearest one in focus tells you your closest focal point. If you repeat the test under different light conditions, you will know your closest focal point for each light condition.



PHOTOGRAPHS OF ANIMALS

If you have ever tried to photograph wild animals, you already know that it is not easy. You will need a good deal of patience regardless of the technique you use.

Some animals, such as reptiles and amphibians, can be captured, photographed in a natural setting, then released. For others, such as some birds and small mammals, you can use food to coax them in close to you. For other animals and other techniques, you will need varying amounts of patience and equipment combined with stalking and "engineering" skills.

Blinds, described in the section on observing

wildlife, are very useful. A good place for a blind is near a bird feeder.

If you have a tripod (or can devise some means of holding your camera still) and a way of releasing the shutter by remote control, you can put your camera where you expect the animal to be. Watch from a place of concealment some distance away and, when the animal is in the right place, take the picture. You may be able to devise a way to have an animal take its own picture.

For some cameras you can purchase remote control devices. Or you can use the diagrams shown here for ideas on how to make one for your camera and equipment. A flash will be useful since many animals are active at night.

